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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,467	12/27/2005	Yukio Miyairi	126464	8186

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EXAMINER	
RIPA, BRYAN D	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
12/22/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction27049@oliff.com
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Office Action Summary	Application No.	Applicant(s)	
	10/562,467	MIYAIRI ET AL.	
	Examiner	Art Unit	
	BRYAN D. RIPA	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-14 and 17-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11 and 17-20* is/are rejected.

7)☒ Claim(s) *12-14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

In response to the amendment received on September 3, 2009:

- claims 11-14 and 17-20 are presently pending
- objections to claims 11, 12 and 20 are withdrawn
- both rejections of claims 11-21 under 35 U.S.C. § 112 are withdrawn
- all prior art rejections are withdrawn and new grounds of rejection are presented below in light of the amendments to the claims

Double Patenting

Applicant is advised that should claim 17 be found allowable, claim 18 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

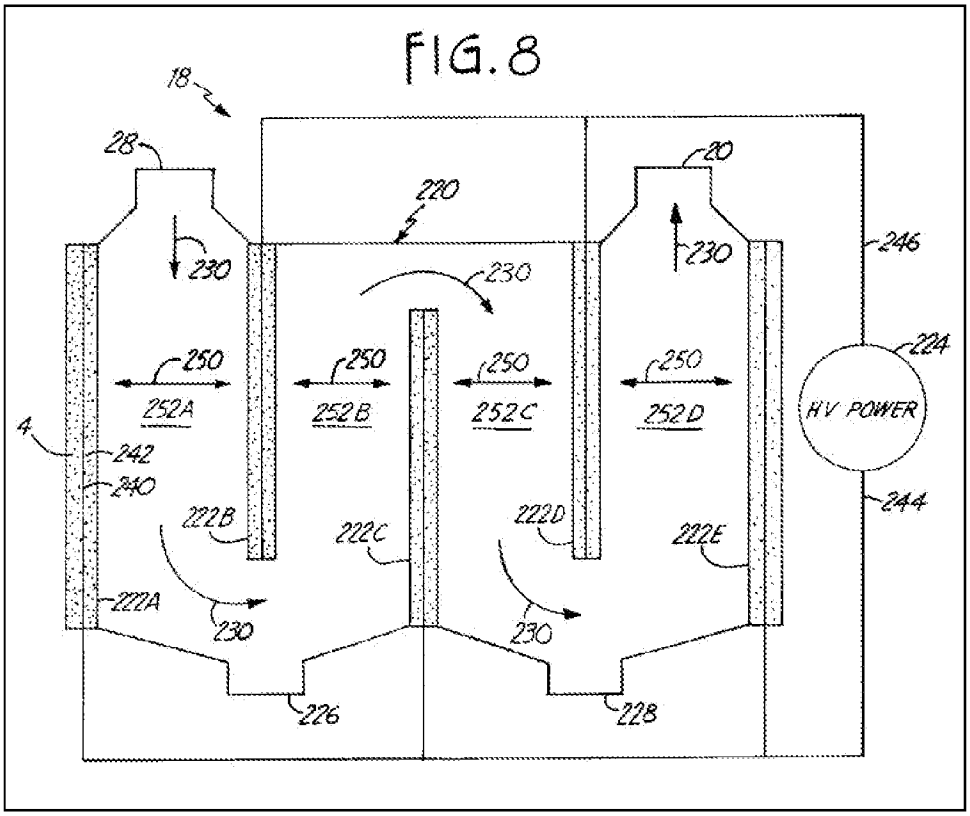
1. Claims 11, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over RUAN in view of NELSON I.

Regarding claim 11, RUAN teaches a plasma generating electrode comprising:

- two or more electrodes disposed to face each other with each of the electrodes having both a fixed-end portion and a free-end portion (see electrode panels 222A–E and col. 6 lines 49-51 teaching the electrodes facing each other to generate plasma in a non-thermal plasma reactor having both a fixed-end portion and a free-end portion);
- holding members for holding the electrodes at a predetermined interval and capable of generating a plasma by applying a voltage between the electrodes (see housing 220 and col. 6 lines 49-57 which teaches housing 220 holding electrode panels 222A–E at a set interval from each other for generating plasma by an application of a voltage from high voltage power source 224); and
- a connection terminal for electrical connection to the fixed end portions of the electrodes (see terminals 244 and 246 and col. 6 lines 63-66 discussing the power source being electrically coupled to the electrodes at the fixed end portions);

- wherein at least one of the electrodes facing each other has a plate-shaped ceramic body serving as a dielectric body and a conductive film disposed inside the ceramic body (see dielectric material 242 and 4, conductor 240, and col. 6 lines 57-63); and
- the holding members fix the fixed-end portions of the electrodes facing each other in the state of a cantilever in such a condition that the electrodes are held by the holding members in the state of cantilevers of the different directions alternately at a predetermined interval as a whole (see electrode panels 222A–E and col. 6 lines 63-67 showing alternating electrode panels being held in a cantilever state with alternating polarity). See figure 8 below.

Please note, in interpreting the phrase “cantilever state” the examiner is requiring the electrode to be fixed or attached only at a single end, i.e. thereby requiring the other end to be unattached or unsecured by the other side of the reactor housing either physically or by any other attachment means such as an adhesive.



However, RUAN, as mentioned in the previous office action, is silent as to the plasma generating electrode having as a main component of the connection terminal a metal with a thermal expansion coefficient of 7×10^{-6} (1/K) at 0 to 600ºC or less.

However, NELSON I teaches the main component of the connection terminal material being a metal with a similar thermal expansion coefficient to that of the dielectric layers, i.e. equal to or less than 7×10^{-6} (1/K) at 0 to 600ºC (see ¶65 teaching the use of low-expansion iron-nickel alloys among other materials for use in the connection terminal; see also applicant's specification at ¶65 teaching the use of iron-nickel based low-expansion alloy as a suitable material by having a thermal expansion coefficient as claimed).

Moreover, NELSON I teaches the motivation for using such materials in fabricating the connection terminal in order to allow for robust high temperature operation (see ¶65).

Consequently, it would have been obvious to one of ordinary skill in the art at the time of invention to use a low-expansion iron-nickel alloy having a thermal expansion coefficient of 7×10^{-6} (1/K) or less at 0 to 600ºC as taught by NELSON I in order to facilitate the more robust operation of the plasma reactor at high temperatures.

Regarding claims 17 and 18, RUAN teaches the plasma generating electrode where the connection terminal is connected to the fixed end portions of the electrodes (see terminals 244 and 246 and col. 6 lines 63-66 discussing the power source being electrically coupled to the electrodes at the fixed end portions). See figure 8 above.

The claim limitation reciting "the connection terminal is connected to the fixed end portions of the electrodes by welding, brazing, or diffusion bonding" is considered a product-by-process claim limitation. The cited prior art teaches all of the positively recited structure of the claimed apparatus or product. The determination of patentability is based upon the apparatus structure itself. The patentability of a product or apparatus does not depend on its method of production or formation. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (see MPEP § 2113).

Additionally, as evidenced by NELSON I, it is well known in the art to make such an electrical connection by welding or brazing (see ¶95).

2. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over RUAN as applied to claim 11 above, and further in view of NELSON II.

Regarding claim 19, RUAN is silent as to how the connection terminal is formed.

However, NELSON II teaches the formation of the connection terminal by plating a conductive layer on the fixed end portions of the electrodes amongst other known methods (see ¶45 teaching the formation of bus connection paths formed by a plating method).

Consequently, as shown by NELSON II, a person of ordinary skill in the art would accordingly have recognized the use of a plating method to facilitate the formation of the connection terminal.

The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395–97 (2007) (see MPEP § 2143, A.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a plating method, as taught by NELSON II, to form the conductive layer comprising the connection terminal in the disclosed plasma reactor of RUAN in order to obtain the predictable result of having a connection terminal as claimed.

3. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over RUAN in view of SHINICHI, MIYAO, and FUJII.

Regarding claim 20, RUAN teaches a plasma reactor comprising a plasma generating electrode comprising:

- two or more electrodes disposed to face each other with each of the electrodes having both a fixed-end portion and a free-end portion (see NTP reactor 18 and col. 6 lines 47-67);
- holding members for holding the electrodes at a predetermined interval and capable of generating plasma by applying a voltage between the electrodes (see housing 220 and col. 6 lines 49-57 which teaches housing 220 holding electrode panels 222A–E at a set interval from each other for generating plasma by an application of a voltage from high voltage power source 224);
- wherein at least one of the electrodes facing each other has a plate-shaped ceramic body serving as a dielectric body and a conductive film disposed inside the ceramic body (see dielectric material 242 and 4, conductor 240, and col. 6 lines 57-63); and
- the holding members fix the fixed-end portions of the electrodes facing each other in the state of a cantilever in such a condition that the electrodes are held by the holding members in the state of cantilevers of the different directions alternately at a predetermined interval as a whole (see electrode panels 222A–E

and col. 6 lines 63-67 showing alternating electrode panels being held in a cantilever state with alternating polarity); and

- a case body having a passage of gas containing a predetermined component and being capable of making the predetermined component contained in the gas react with plasma generated by the plasma generating electrode when the gas is introduced into the case body (see housing 220 and col. 3 lines 12-15 and col. 6 lines 42-46 teaching the housing being adapted so as to pass a flue gas through the reactor to remove various hazardous oxides in the gas). See figure 8 above.

However, RUAN is silent as to the plasma reactor further comprising a honeycomb structure having a plurality of cells separated by partition walls and disposed on an upstream side of the plasma generating electrode in the passage of the case body.

However, SHINICHI teaches the use of an oxidation catalyst on the upstream side of the plasma reactor in order to help control the emissions of NO_X (see ¶17 and drawing 1). Additionally, FUJII teaches the application of the catalyst layer on a honeycomb-shaped carrier which would have a plurality of cells separated by partition walls (see col. 2 lines 48-49 and col. 3 lines 9-20). Moreover, MIYAO teaches an emission control device having a plasma reactor and a catalyst layer in a single case body (see ¶24 and drawing 6).

Consequently, as shown by SHINICHI, FUJII, and MIYAO, a person of ordinary skill in the art would accordingly have recognized the use of a honeycomb structure

disposed on an upstream side of the plasma generating electrode in the passage of the case body.

The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395–97 (2007) (see MPEP § 2143, A.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the honeycomb structure of FUJII for use as an upstream catalyst support as taught in SHINICHI in a single case body as shown in MIYAO to obtain the predictable result of providing a catalyst support structure as claimed.

Additionally, RUAN as modified by SHINICHI, MIYAO, and FUJII do not explicitly teach the honeycomb structure having a cell density of between 15 and 186 cells/cm^2.

However, since the honeycomb structure is acting as a catalyst support through which the exhaust gas must flow it would have been obvious to optimize the cell density so as to provide for a sufficient surface area to achieve the desired catalytic cleaning while not providing a cell density so large as to restrict the flow of the exhaust gas. See MPEP § 2144.05.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the cell density of the catalyst supporting honeycomb structure so as to provide for a cell density as claimed.

Allowable Subject Matter

4. Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The aforementioned U.S. Pat. No. 6,146,599 to RUAN and U.S. Pub. No. 2002/0076363 to NELSON II; and U.S. Patents No. 6,576,202 to Chiu (hereinafter referred to as "CHIU"); and 4,472,174 to Chuan (hereinafter referred to as “CHUAN”) represent the most relevant art.

Regarding claim 12, the cited prior art fails to teach a plasma generating electrode wherein the holding members have a large number of first grove portions for inserting the free end portions of the electrodes therein with a predetermined gap on each surface opposite the free end portions.

Moreover, while NELSON II does teach the holding members being adapted so as to have grooves for inserting the free end portions of the electrodes therein (see figures 1), NELSON II does not teach the free end portions of the electrodes being in a cantilever state or having a predetermined gap between the holding member and each side of the electrode (see ¶75 teaching the use of a suitable adhesive to bond the ends of the plate tines, i.e. electrodes, into the retention pockets, i.e. grooves).

Response to Arguments

Applicant's arguments filed September 3, 2009 have been fully considered but they are not persuasive.

Applicant argues that:

"Nelson [II] does not disclose a main component of the connection terminal having a thermal expansion coefficient of 7xl0-6 (I/K) at 0 to 600°C or less." See Remarks at page 6

While the examiner acknowledges that NELSON II does not explicitly teach the connection terminal material having a thermal expansion coefficient of 7×10^{-6} (1/K) or less at 0 to 600ºC, the examiner respectfully disagrees with applicant's contention that NELSON II does not disclose the use of a material having a thermal expansion coefficient as claimed. As discussed above, the low-expansion iron-nickel alloy taught by NELSON II as a suitable material for connection terminal inherently has a thermal expansion coefficient within the claimed range as taught by applicant's specification (see applicant's specification ¶65 teaching the use of iron-nickel based low-expansion alloy as a suitable material, i.e. having the desired properties such as a thermal expansion coefficient within the claimed range).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYAN D. RIPA whose telephone number is 571-270-7875. The examiner can normally be reached on Monday to Friday, 9:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/
Primary Examiner, Art Unit 1795

/B. D. R./
Examiner, Art Unit 1795